

**REMARKS**

In view of the following remarks, Applicant respectfully requests reconsideration and allowance of the subject application.

**§103 Rejections**

Claims 1-22 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over US Patent No. 4,896,261 to Nolan (hereinafter, "Nolan") and further in view of US Patent No. 5,379,297 to Glover et al (hereinafter, "Glover"). Applicant respectfully traverses the rejection.

Nolan teaches a system for scheduling serial message transmissions on a bus (col. 1, lines 9-10, lines 58-60). The system in Nolan controls message transmission through the use of a message list 28. The message list 28 comprises message pointer blocks 27. The system schedules messages by altering the previous and next message pointer block addresses in various pointer blocks in the message list. The message list 28 specifies the order in which messages are to be transmitted by the microprocessor 17. (col. 5, lines 22-29).

Claim 1 recites the following:

A machine-readable medium having a data structure stored thereon for efficiently ordering a plurality of entities, each entity having a rank within a plurality of ranks, the data structure comprising:

a horizontally linked list linking at least a subset of the plurality of entities in at least a descending rank order direction, each entity in the horizontally linked list having a unique rank as compared to the ranks of other entities in the horizontally linked list; and,

an array having a plurality of array entries over which the plurality of ranks are distributed such that each array entry has a corresponding range of ranks, at least one array entry each pointing to an entity of the plurality of entities having a greatest rank within the corresponding range of ranks for the array entry.

1       Regarding claim 1, the Office asserts that Nolan teaches, at col. 9, lines 29-  
2       40, and col. 11, lines 12-20, "an array having a plurality of array entries over  
3       which the plurality of ranks are distributed such that each array entry has a  
4       corresponding range of ranks, at least one array entry each pointing to an entity of  
5       the plurality of entities having a greatest rank within the corresponding range of  
6       ranks for the array entry".

7       However, referring to Nolan at Figs. 1 and 2, it can more clearly be seen  
8       that Nolan actually teaches a message list 28 having message pointer blocks 27  
9       associated with messages 21 that are destined for serial transmission on a single  
10      bus 11. The message pointer blocks 27 each include a start and end memory  
11      address for an associated message, in addition to the memory address of the  
12      pointer block associated with the next message scheduled to be sent over the bus.  
13      Both the messages 21 and the message list 28 are stored in a memory 21 and 22,  
14      respectively, which can be the same memory. However, neither the messages 21  
15      nor the message list 28 amounts to "an array having a plurality of array entries  
16      over which the plurality of ranks are distributed such that each array entry has a  
17      corresponding range of ranks, at least one array entry each pointing to an entity of  
18      the plurality of entities having a greatest rank within the corresponding range of  
19      ranks for the array entry", as in Applicant's claim 1.

20      From Fig. 2 of Nolan, it can be seen that a message list 28 includes  
21      message pointer blocks 27. Each message block 27 refers to a single message 21  
22      (Fig. 2; col. 5, lines 10-30). By way of an attempted analogy to claim 1, if the  
23      message list 28 is considered to be an "array", and each message block 27 is  
24      considered to be one of the "array entries", then it is clear that each array entry  
25      does not have a "corresponding range of ranks", which is an element of claim 1.

1 Rather, each array entry (i.e., each message block 27) points to one, and only one,  
2 message 21. Claim 1 recites that "each array entry has a corresponding range of  
3 ranks". At a minimum, therefore, each message block 27 in Nolan would have to  
4 at least point to a *range* of messages 21 in order to be considered even similar to  
5 claim 1 with respect to "each array entry has a corresponding range of ranks".  
6 However, as noted above, each message block 27 in Nolan does not point to a  
7 range of messages 21. Rather, each message block 27 points only to a single  
8 message 21. Accordingly, Nolan cannot fairly be said to teach that "each array  
9 entry has a corresponding range of ranks".

10 Furthermore, other than the message list 28 and message pointer blocks 27,  
11 there are no other structures or descriptions in Nolan that could be considered to  
12 be analogous to the "array" and "array entries" recited in claim 1. Therefore,  
13 Applicant respectfully submits that there is nothing in Nolan that teaches "an array  
14 having a plurality of array entries over which the plurality of ranks are distributed  
15 such that each array entry has a corresponding range of ranks, at least one array  
16 entry each pointing to an entity of the plurality of entities having a greatest rank  
17 within the corresponding range of ranks for the array entry", as recited in  
18 Applicant's claim 1. Accordingly, the 35 U.S.C. §103(a) rejection of claim 1 is  
19 not supported, and Applicant respectfully requests that it be removed.

20 The Office next refers to Glover for support. Regarding claim 1, the Office  
21 cites Glover only for its purported discussion of a "horizontally linked list", and  
22 not for any teaching or suggestion of an array or array entries as discussed above.  
23 Furthermore, Applicant cannot find any such teaching or suggestion in Glover  
24 regarding an array or array entries as discussed above regarding claim 1.  
25

1 Accordingly, Glover does not remedy the deficiencies of Nolan noted above, and  
2 claim 1 is allowable over the combination of these two references.

3 Further regarding claim 1, the Office admits that Nolan does not teach the  
4 use of a horizontally linked list. However, the Office asserts that Glover (at Fig.  
5 12; col. 6, lines 57-67; col. 49, line 59 - col. 50, line 13) teaches "a horizontally  
6 linked list linking at least a subset of the plurality of entities in at least a  
7 descending rank order direction, each entity in the horizontally linked list having a  
8 unique rank as compared to the ranks of other entities in the horizontally linked  
9 list" as recited in Applicant's claim 1.

10 Glover teaches a communication unit for concurrently processing cells in  
11 an asynchronous transfer mode (ATM) network. Packets that are to be transmitted  
12 are segmented into a plurality of cells, concurrently, for a plurality of channels for  
13 transmission over the (ATM) network. Cells received from the ATM network are  
14 reassembled concurrently for the plurality of channels. A pipelined segmentation  
15 unit includes a pipelined segmentation processor, control memory, and data  
16 memory where the segmentation unit receives the packet inputs for two or more  
17 channels and provides ATM cell outputs concurrently for the two or more  
18 channels. A pipelined reassembly unit includes a pipelined reassembly processor,  
19 control memory, and data memory where the reassembly unit receives the ATM  
20 cell inputs for the two or more channels and provides packet outputs concurrently  
21 for the two or more channels. (col. 6, lines 23-45).

22 The control memory stores two-dimensional queues (rate queues, channel  
23 queues) of descriptors. Each descriptor identifies a single packet to be transmitted,  
24 and stores information about the single packet for use in segmentation or  
25 reassembly. Each of a plurality of rate queues is associated with one transmission

1 rate. Each rate queue is a linked list of descriptors where each descriptor in the  
2 rate queue identifies a packet from a different channel having cells to be  
3 transmitted at the rate for the particular rate queue. A plurality of channel queues  
4 is provided, one for each channel having a descriptor in a rate queue. Each  
5 channel queue is a linked list of descriptors where each descriptor identifies a  
6 packet to be transmitted. A linked list of descriptors for a channel queue identifies  
7 all the packets to be transmitted on a single channel associated with that channel  
8 queue. (col. 6, line 46 - col. 7, line 6).

9 Fig. 12 of Glover illustrates rate queues and channel queues created in the  
10 control memory. Rate queues appear in the vertical direction while channel  
11 queues appear in the horizontal direction. Each rectangle in Fig. 12 represents a  
12 packet identified by a descriptor in the left portion of the rectangle. Each rate  
13 queue includes descriptors for packets that are to be transferred over the ATM  
14 network at the same transmission rate. Each channel queue includes descriptors  
15 for packets that are to be transferred over the ATM network over the same  
16 channel. (col. 49, line 48 - col. 50, line 25).

17 It is clear from the above description of Glover regarding Fig. 12 (Figs. 12-  
18 1, 12-2, 12-3, 12-4), for example, at cols. 49 and 50, that a channel queue (i.e., a  
19 horizontally linked channel list) includes descriptors that *identify* packets to be  
20 transmitted over one, single channel. The channel queue simply identifies and  
21 associates those packets to be transmitted over the same channel. A channel queue  
22 does not link entities (i.e., packets) in a *descending rank order*. A channel queue  
23 does not link entities in any *rank order* at all. There is no rank order associated  
24 with the packets that are linked together in Glover's channel queues. Rather,  
25

1 Glover's channel queues merely identify which packets are to be transmitted over  
2 a particular channel.

3 Thus, Applicant respectfully submits that Glover does not teach "a  
4 horizontally linked list linking at least a subset of the plurality of entities in at least  
5 a descending rank order direction, each entity in the horizontally linked list having  
6 a unique rank as compared to the ranks of other entities in the horizontally linked  
7 list", as recited in Applicant's claim 1. Accordingly, for these additional reasons,  
8 Applicant respectfully submits that the 35 U.S.C. §103(a) rejection of claim 1 is  
9 not supported, and requests that the rejection be removed.

10 Claims 2-9 depend from claim 1 and therefore include the elements of  
11 claim 1. Therefore, claims 2-9 are allowable at least on the basis of this  
12 dependency, in addition to the further elements recited therein which are neither  
13 shown nor suggested by the cited references. Accordingly, Applicant respectfully  
14 requests that the 35 U.S.C. §103(a) rejection to claims 2-9 be removed.

15 Regarding independent claim 10, the Office asserts that Nolan teaches (at  
16 col. 9, lines 29-40, and col. 11, lines 12-20) the following from Applicant's claim  
17 10:

18 A method for removing a particular entity from a plurality of  
19 entities, each entity having a rank within a plurality of ranks, the  
method comprising:

20 in response to determining that the particular entity is present  
21 within a vertically linked list linking in at least one direction a  
22 corresponding subset of the plurality of entities having an identical  
rank, the corresponding subset including the particular entity

23 However, as noted above regarding claim 1, Nolan teaches message blocks  
24 27 that each point only to a single message 21. Each message block does not point  
25 to a range (or *plurality*) of messages 21. Thus, it cannot fairly be said that Nolan

1 teaches "each entity having a rank within a *plurality* of ranks", as is recited in  
2 Applicant's claim 10. Therefore, Applicant respectfully submits that the cited  
3 references do not support a prima facie case of obviousness, and that the rejection  
4 to claim 10 should be removed.

5 Furthermore, regarding claim 10, neither of the cited references teaches "in  
6 response to determining that the particular entity is present within a vertically  
7 linked list . . .". Neither Nolan nor Glover discuss such "determining" as recited  
8 in claim 10. For this additional reason, the rejection of claim 10 is not supported,  
9 and Applicant respectfully requests that it be removed.

10 Further regarding claim 10, the Office admits that Nolan does not teach the  
11 use of a horizontally/vertically linked list, but refers to Glover and asserts that  
12 Glover teaches the following:

13 A method of determining that the particular entity is present  
14 within a horizontally linked list linking at least a subset of the plurality  
15 of entities in at least in a descending rank order direction, the subset  
including the particular entity

16 However, as noted above regarding claim 1, Glover does not teach "a  
17 horizontally linked list linking at least a subset of the plurality of entities in at least  
18 in a descending rank order". Packets linked together in Glover's channel queues  
19 do not provide a rank order at all. Rather, Glover's channel queues merely  
20 identify which packets are to be transmitted over a particular channel.

21 For this additional reason, Applicant respectfully submits that the cited  
22 references do not support a prima facie case of obviousness with respect to claim  
23 10, and that the rejection to claim 10 should therefore be removed.  
24  
25

1       **Claims 11-18** depend from claim 10 and therefore include the elements of  
2 claim 10. Therefore, claims 11-18 are allowable at least on the basis of this  
3 dependency, in addition to the further elements recited therein which are neither  
4 shown nor suggested by the cited references. Accordingly, Applicant respectfully  
5 requests that the 35 U.S.C. §103(a) rejection to claims 11-18 be removed.

6       Regarding independent **claim 19**, the Office asserts that Nolan teaches  
7 various elements of claim 19, including the following, for example:

8               A method for adding a new entity having a rank within a  
9 plurality of ranks to a plurality of entities also each having a rank within  
the plurality of ranks, the method comprising:

10              of a plurality of array entries of an array over which the plurality  
of ranks are distributed such that each array entry has a corresponding  
11 range of ranks, determining the array entry having the corresponding  
range of ranks in which the rank of the new entity lies;

12              adjusting the array entry having the corresponding range of ranks  
13 into which the rank of the new entity lies to point to the new entity in  
response to determining that the array entry currently points to null  
14

15       However, it is apparent that at least some of these elements of claim 19 are  
16 similar to or the same as elements already discussed above regarding claims 1 and  
17 10 with reference to Nolan. Accordingly, the same discussion above regarding the  
18 rejection of claims 1 and 10 applies equally to the rejection of claim 19. Applicant  
19 therefore respectfully submits that the cited references do not support the  
20 obviousness rejection to claim 19, and that the rejection should therefore be  
21 removed.

22       Furthermore, regarding claim 19, the Office asserts that Glover teaches  
23 various elements of claim 19, including the following, for example:

24              A method of linking the new entity into a vertically linked list  
25 linking in at least one direction a corresponding subset of the plurality



1 of entities having an identical rank, in response to determining that the  
2 rank of the new entity is equal to the rank of any other entity within the  
3 plurality of entities; and,

4 otherwise, linking the new entity into a horizontally linked list  
5 linking at least a subset of the plurality of entities in at least a  
6 descending rank order direction, each entity in the horizontally linked  
7 list having a unique rank as compared to the ranks of other entities in  
8 the horizontally linked list.

9 However, it is apparent that at least some of these elements of claim 19 are  
10 similar to or the same as elements already discussed above regarding claims 1 and  
11 10 with reference to Glover. Accordingly, the same discussion above regarding  
12 the rejection of claims 1 and 10 applies equally to the rejection of claim 19.  
13 Applicant therefore respectfully submits that the cited references do not support  
14 the obviousness rejection to claim 19, and that the rejection should therefore be  
15 removed.

16 **Claims 20-22** depend from claim 19 and therefore include the elements of  
17 claim 19. Therefore, claims 20-22 are allowable at least on the basis of this  
18 dependency, in addition to the further elements recited therein which are neither  
19 shown nor suggested by the cited references. Accordingly, Applicant respectfully  
20 requests that the 35 U.S.C. §103(a) rejection to claims 20-22 be removed.

## 21 Conclusion

22 All pending claims, 1-22, are believed to be in condition for allowance.  
23 Applicant respectfully requests reconsideration and prompt issuance of the present  
24 application. Should any issue remain that prevents immediate issuance of the  
25 application, the Examiner is encouraged to contact the undersigned attorney to  
discuss the unresolved issue.

Respectfully Submitted,

Dated: 6/8/04

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